



## Use of Tetanus Vaccine in Veterinary Treatment

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### DESCRIPTION

Tetanus is caused by *Clostridium tetani* neurotoxin, which is found in soil and intestinal tracts and is usually hosted into tissues through deep puncture wounds. The toxin causes generalized spastic paralysis of the muscles. Clinical signs and history are usually enough to make a diagnosis. The treatment is supportive, including thorough wound flushing and the injection of tetanus antitoxin.

Tetanus toxemia is caused by a neurotoxin produced in necrotic tissue by *Clostridium tetani*. Almost all mammals are vulnerable, with dogs and cats doing better than any other domestic or laboratory mammal. Birds are extremely resistant; the lethal dose for pigeons and chickens is 10,000-300,000 times greater (based on body weight) than for horses. With the possible exception of humans, horses and lambs appear to be the most sensitive of all species.

*Clostridium tetani* is an anaerobe with terminal, spherical spores that lives in soil, particularly cultivated soil, and in intestinal tracts. Most of the time, it enters the tissues through wounds, particularly deep puncture wounds that provide an anaerobic environment. Tetanus, on the other hand, frequently follows docking or castration in lambs and other species. The point of entry cannot always be found because the wound is minor or healed. *Clostridium tetani* spores cannot grow in healthy tissue or even in wounds if the tissue maintains the normal oxidation-reduction potential of the circulating blood. When a small amount of soil or a foreign object causes tissue necrosis, the conditions for multiplication are met. The bacteria multiply while remaining in the necrotic tissue at the original site of infection. The potent neurotoxin is released as bacterial cells

autolyze. The neurotoxin is a zinc-binding protease that cleaves synaptobrevin, a membrane protein found in vesicles. Toxin is typically absorbed by the local motor nerves and travels retrograde up the nerve tract to the spinal cord, where it causes ascending tetanus. Recumbent horses have a poor prognosis, especially if clinical signs progress rapidly. Affected horses that can stand have a good prognosis, with recovery taking 2-6 weeks.

### DIAGNOSIS AND TREATMENT

A clinical diagnosis of tetanus is usually made based on clinical signs and a history of recent trauma. It is possible to confirm the diagnosis by detecting tetanus toxin in the affected animal's serum. In cases where the wound is visible, gram-stained smears and anaerobic cultures may be used to confirm the bacterium. On wound material, a Polymerase Chain Reaction (PCR) assay can be performed. Tetanus toxoid administration can be used to achieve active immunization. If a dangerous wound develops after immunization, another toxoid injection should be given to boost the amount of circulating antibody. Toxoid should be given concurrently with antitoxin and repeated every 30 days. Although not scientifically supported, yearly booster injections of toxoid are recommended in animals; in humans, the toxoid is administered every ten years. The interval between toxoid vaccinations is currently being debated among vaccine recommendations for sport horses. Mares should be vaccinated during the last 6 weeks of pregnancy, and foals should be vaccinated when they are 5-8 weeks old. Foals in high-risk areas may be given tetanus antitoxin immediately after birth and every 2-3 weeks until they are 3 months old, at which point they can be given toxoid.

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